

## VMmark® 3.1.1 Results

**Server Vendor & Model: Dell EMC PowerEdge R6525**  
**Storage Vendor & Model: VMware vSAN - All Flash**  
**Hypervisor: VMware ESXi 7.0 U2 build 17583127**  
**Datacenter Management Software: VMware vCenter Server 7.0 U2 Build 17579766**

**VMmark 3.1.1 Score =**  
**29.73 @ 32 Tiles**

Number of Hosts: 4	Uniform Hosts [yes/no]: yes	Total sockets/cores/threads in test: 8/512/1024
Tested By: Dell Inc.		Test Date: 03-15-2021
<b>Performance Section</b> <a href="#">Performance</a>	<b>Configuration Section</b> <a href="#">Configuration</a>	<b>Notes Section</b> <a href="#">Notes for Workload</a>

### Performance

	weathervane			weathervaneE			dvdstoreA			dvdstoreB			dvdstoreC			
TILE_0	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3577.47	0.99	0.32   0.01	563.45	0.98	0.72   0.60	872.58	1.19	1025.33	596.92	1.19	1217.02	407.23	1.17	1393.97	1.10
p1	3569.43	0.99	0.32   0.00	557.91	0.98	0.68   0.43	885.45	1.21	960.46	640.25	1.28	1101.63	469.80	1.35	1224.92	1.15
p2	3556.40	0.99	0.34   0.04	557.53	0.97	0.49   0.19	906.15	1.23	913.03	626.33	1.25	1076.39	432.02	1.25	1212.04	1.13
TILE_1	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3577.46	0.99	0.41   0.00	569.76	1.00	1.06   0.78	888.08	1.21	971.54	607.45	1.21	1155.02	421.93	1.22	1280.05	1.12
p1	3564.64	0.99	0.41   0.00	567.74	0.99	1.14   0.78	864.00	1.18	1039.43	615.65	1.23	1216.77	448.20	1.29	1351.17	1.13
p2	3558.09	0.99	0.42   0.18	566.96	0.99	1.28   0.80	883.48	1.20	977.02	606.10	1.21	1151.11	414.85	1.20	1311.11	1.11
TILE_2	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3571.92	0.99	0.31   0.01	564.61	0.99	0.47   0.17	905.67	1.23	962.67	624.02	1.25	1149.51	423.73	1.22	1337.20	1.13
p1	3553.66	0.99	0.36   0.15	563.41	0.98	0.38   0.13	862.77	1.17	1067.83	615.90	1.23	1234.19	450.35	1.30	1378.46	1.13
p2	3544.19	0.99	0.33   0.00	559.82	0.98	0.51   0.32	882.60	1.20	990.52	607.77	1.21	1168.34	416.62	1.20	1322.90	1.11
TILE_3	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3580.01	1.00	0.39   0.00	568.59	0.99	0.53   0.26	897.42	1.22	931.78	617.52	1.23	1113.69	432.00	1.25	1224.17	1.13
p1	3573.30	0.99	0.37   0.00	567.28	0.99	0.50   0.20	892.98	1.22	940.91	638.58	1.28	1100.38	477.57	1.38	1181.94	1.16
p2	3548.80	0.99	0.35   0.04	563.17	0.98	0.45   0.17	880.45	1.20	999.40	600.08	1.20	1203.33	393.32	1.13	1348.00	1.10
TILE_4	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3573.21	0.99	0.37   0.00	569.69	1.00	0.69   0.27	949.20	1.29	797.43	659.77	1.32	937.92	459.12	1.32	1049.24	1.17
p1	3564.43	0.99	0.40   0.01	570.48	1.00	0.75   0.33	945.30	1.29	791.66	683.35	1.37	925.56	509.50	1.47	1013.34	1.21
p2	3549.56	0.99	0.42   0.22	562.32	0.98	0.44   0.20	948.58	1.29	783.75	662.35	1.32	926.49	459.65	1.33	1030.81	1.17
TILE_5	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(nRT MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
p0	3575.89	0.99	0.45   0.00	566.21	0.99	0.73   0.50	935.83	1.27	814.83	651.65	1.30	960.47	457.23	1.32	1054.58	1.17

<b>p1</b>	3565.49	0.99	0.46   0.01	561.48	0.98	0.58   0.35	924.70	1.26	854.24	668.70	1.34	989.15	496.20	1.43	1069.01	1.19
<b>p2</b>	3551.60	0.99	0.44   0.03	564.22	0.99	0.57   0.27	930.27	1.27	837.47	645.48	1.29	991.95	448.32	1.29	1106.04	1.16
<b>TILE_6</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3581.85	1.00	0.42   0.08	569.27	0.99	1.19   0.87	926.05	1.26	859.38	646.92	1.29	1007.23	448.77	1.29	1123.06	1.16
<b>p1</b>	3568.67	0.99	0.36   0.00	566.09	0.99	0.45   0.19	916.52	1.25	881.41	664.85	1.33	1003.55	488.48	1.41	1120.17	1.18
<b>p2</b>	3552.92	0.99	0.37   0.03	563.95	0.99	0.56   0.29	930.10	1.27	832.97	649.55	1.30	984.83	429.38	1.24	1099.90	1.15
<b>TILE_7</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3571.83	0.99	0.38   0.04	566.22	0.99	0.58   0.26	888.58	1.21	973.10	602.25	1.20	1174.43	415.50	1.20	1319.20	1.11
<b>p1</b>	3562.72	0.99	0.36   0.00	565.04	0.99	0.54   0.37	867.83	1.18	1017.51	618.23	1.24	1189.45	430.98	1.24	1328.70	1.12
<b>p2</b>	3544.86	0.99	0.36   0.00	563.39	0.98	0.64   0.27	891.42	1.21	955.90	608.90	1.22	1147.20	418.25	1.21	1295.12	1.12
<b>TILE_8</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3564.98	0.99	0.39   0.00	565.90	0.99	0.54   0.30	890.67	1.21	955.56	614.02	1.23	1123.33	419.00	1.21	1290.51	1.12
<b>p1</b>	3561.79	0.99	0.39   0.05	562.44	0.98	0.48   0.27	897.00	1.22	928.89	638.30	1.28	1115.87	445.73	1.29	1245.41	1.14
<b>p2</b>	3555.07	0.99	0.40   0.00	560.93	0.98	0.58   0.32	899.62	1.23	931.08	618.85	1.24	1101.81	424.95	1.23	1255.99	1.12
<b>TILE_9</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3578.24	0.99	0.45   0.10	563.74	0.99	0.51   0.29	845.83	1.15	1128.15	576.77	1.15	1339.74	407.18	1.17	1531.55	1.09
<b>p1</b>	3568.86	0.99	0.37   0.00	561.08	0.98	0.45   0.24	850.48	1.16	1121.35	591.52	1.18	1354.04	410.25	1.18	1511.21	1.10
<b>p2</b>	3555.07	0.99	0.39   0.00	558.78	0.98	0.43   0.10	831.08	1.13	1200.63	538.12	1.08	1445.23	373.38	1.08	1656.57	1.05
<b>TILE_10</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3579.04	0.99	0.41   0.18	564.21	0.99	0.69   0.40	925.23	1.26	859.48	639.60	1.28	1016.34	445.57	1.28	1136.15	1.15
<b>p1</b>	3565.36	0.99	0.42   0.01	560.58	0.98	0.37   0.11	914.02	1.24	895.11	640.52	1.28	1099.46	456.65	1.32	1193.09	1.15
<b>p2</b>	3557.59	0.99	0.40   0.00	556.31	0.97	0.71   0.50	926.48	1.26	864.63	613.30	1.23	1040.10	441.32	1.27	1156.80	1.14
<b>TILE_11</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3578.30	0.99	0.49   0.04	570.14	1.00	0.76   0.42	885.23	1.21	981.50	606.77	1.21	1159.39	437.75	1.26	1300.75	1.13
<b>p1</b>	3560.20	0.99	0.44   0.15	566.39	0.99	0.63   0.27	901.33	1.23	927.55	615.75	1.23	1110.76	447.10	1.29	1239.14	1.14
<b>p2</b>	3544.64	0.99	0.42   0.00	561.73	0.98	0.43   0.21	910.75	1.24	893.06	629.25	1.26	1061.27	435.93	1.26	1179.26	1.14
<b>TILE_12</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3577.46	0.99	0.40   0.00	566.68	0.99	0.42   0.17	941.75	1.28	803.07	683.33	1.37	929.47	475.62	1.37	1069.82	1.19
<b>p1</b>	3570.38	0.99	0.38   0.00	564.78	0.99	0.43   0.20	951.27	1.30	775.70	665.58	1.33	910.20	480.10	1.38	1039.21	1.18
<b>p2</b>	3556.72	0.99	0.40   0.00	561.48	0.98	0.52   0.16	944.95	1.29	801.15	659.38	1.32	945.18	450.95	1.30	1093.09	1.16
<b>TILE_13</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3583.40	1.00	0.43   0.07	565.16	0.99	0.80   0.56	884.80	1.20	982.41	627.60	1.25	1150.76	430.50	1.24	1330.95	1.13
<b>p1</b>	3560.04	0.99	0.49   0.20	561.31	0.98	0.58   0.44	881.58	1.20	982.04	605.40	1.21	1159.58	437.20	1.26	1303.33	1.12
<b>p2</b>	3548.27	0.99	0.42   0.00	561.01	0.98	0.48   0.15	878.83	1.20	1005.35	599.67	1.20	1198.52	408.35	1.18	1361.89	1.10
<b>TILE_14</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3581.68	1.00	0.40   0.00	568.86	0.99	0.92   0.57	995.23	1.36	667.45	729.95	1.46	777.45	515.10	1.49	866.28	1.24

<b>p1</b>	3569.82	0.99	0.36   0.02	562.33	0.98	0.52   0.37	986.50	1.34	690.33	693.77	1.39	814.37	508.88	1.47	903.25	1.22
<b>p2</b>	3557.92	0.99	0.45   0.02	560.54	0.98	0.59   0.32	990.60	1.35	686.16	694.05	1.39	816.13	482.60	1.39	927.52	1.20
<b>TILE_15</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3576.16	0.99	0.45   0.02	568.22	0.99	0.92   0.56	896.85	1.22	948.62	637.45	1.27	1110.28	443.60	1.28	1257.91	1.14
<b>p1</b>	3564.11	0.99	0.42   0.00	568.45	0.99	0.78   0.33	895.60	1.22	947.71	610.25	1.22	1136.27	440.18	1.27	1276.92	1.13
<b>p2</b>	3553.28	0.99	0.39   0.05	568.56	0.99	0.83   0.50	914.88	1.25	887.58	627.80	1.25	1072.49	432.88	1.25	1208.02	1.14
<b>TILE_16</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3585.51	1.00	0.43   0.06	569.24	0.99	0.83   0.44	865.60	1.18	1050.80	606.42	1.21	1262.56	426.55	1.23	1389.89	1.12
<b>p1</b>	3569.93	0.99	0.42   0.00	565.84	0.99	0.44   0.10	872.00	1.19	1028.32	594.73	1.19	1238.55	425.35	1.23	1390.99	1.11
<b>p2</b>	3552.86	0.99	0.50   0.07	565.11	0.99	0.47   0.14	876.90	1.19	1014.47	592.33	1.18	1248.87	411.50	1.19	1372.15	1.10
<b>TILE_17</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3577.97	0.99	0.40   0.01	570.34	1.00	0.91   0.59	928.02	1.26	846.62	668.27	1.34	985.13	467.68	1.35	1117.20	1.18
<b>p1</b>	3567.57	0.99	0.42   0.02	565.02	0.99	0.52   0.16	931.77	1.27	846.43	646.92	1.29	1013.89	462.82	1.33	1127.89	1.16
<b>p2</b>	3548.52	0.99	0.43   0.06	563.95	0.99	0.39   0.03	927.65	1.26	859.22	636.83	1.27	1028.56	435.62	1.26	1183.18	1.14
<b>TILE_18</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3576.25	0.99	0.37   0.03	567.00	0.99	0.55   0.33	917.08	1.25	892.19	660.00	1.32	1045.45	454.88	1.31	1207.18	1.16
<b>p1</b>	3563.34	0.99	0.35   0.02	560.90	0.98	0.43   0.27	926.52	1.26	872.45	634.02	1.27	1054.55	456.52	1.32	1199.75	1.15
<b>p2</b>	3559.88	0.99	0.38   0.03	561.15	0.98	0.55   0.32	928.65	1.26	860.44	639.38	1.28	1036.04	439.38	1.27	1180.01	1.15
<b>TILE_19</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3584.43	1.00	0.50   0.07	570.96	1.00	0.99   0.57	884.23	1.20	969.51	632.45	1.26	1138.73	437.50	1.26	1287.25	1.14
<b>p1</b>	3567.64	0.99	0.48   0.07	565.23	0.99	0.69   0.39	892.50	1.22	945.28	616.30	1.23	1114.22	441.95	1.27	1258.38	1.13
<b>p2</b>	3548.86	0.99	0.46   0.00	562.77	0.98	0.42   0.29	911.23	1.24	893.86	628.15	1.26	1063.39	429.77	1.24	1223.08	1.13
<b>TILE_20</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3579.90	0.99	0.41   0.00	561.73	0.98	0.85   0.46	932.30	1.27	831.37	677.58	1.35	953.09	472.50	1.36	1077.77	1.18
<b>p1</b>	3566.56	0.99	0.41   0.00	556.44	0.97	0.58   0.31	959.50	1.31	771.58	658.58	1.32	938.29	477.70	1.38	1057.20	1.18
<b>p2</b>	3551.63	0.99	0.43   0.00	555.44	0.97	0.48   0.29	936.98	1.28	821.66	652.95	1.30	974.02	448.77	1.29	1105.96	1.16
<b>TILE_21</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3578.03	0.99	0.37   0.00	564.21	0.99	0.70   0.39	917.73	1.25	873.49	668.02	1.33	1001.74	463.43	1.34	1134.23	1.17
<b>p1</b>	3564.20	0.99	0.51   0.13	560.46	0.98	0.46   0.18	940.33	1.28	822.40	647.40	1.29	993.53	443.70	1.28	1139.30	1.16
<b>p2</b>	3548.93	0.99	0.37   0.20	557.41	0.97	0.49   0.35	917.62	1.25	877.92	640.65	1.28	1017.08	458.50	1.32	1160.57	1.15
<b>TILE_22</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3576.68	0.99	0.42   0.05	560.34	0.98	0.54   0.36	918.35	1.25	890.41	665.12	1.33	1016.11	459.57	1.33	1161.62	1.16
<b>p1</b>	3570.03	0.99	0.35   0.10	559.17	0.98	0.50   0.25	914.85	1.25	898.64	621.55	1.24	1096.46	424.62	1.22	1251.64	1.13
<b>p2</b>	3560.44	0.99	0.38   0.02	557.60	0.97	0.48   0.25	910.73	1.24	901.31	631.00	1.26	1067.62	451.75	1.30	1222.10	1.14
<b>TILE_23</b>	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(nRTI MaxPctF)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	Actual	Ratio	QoS(ms)	GM
<b>p0</b>	3577.31	0.99	0.49   0.03	572.10	1.00	0.64   0.24	884.17	1.20	974.14	636.50	1.27	1122.76	457.02	1.32	1292.71	1.15



<b>p1_score:</b>	36.57			
<b>p2_score:</b>	36.35			
<b>Infrastructure_Operations_Scores:</b>	vMotion	SVMotion	XVMotion	Deploy
<b>Completed_Ops_PerHour</b>	56.00	50.00	40.00	19.00
<b>Avg_Seconds_To_Complete</b>	6.59	92.69	112.60	340.40
<b>Failures</b>	0.00	0.00	0.00	0.00
<b>Ratio</b>	2.15	2.78	2.22	2.38
<b>Number_Of_Threads</b>	2	2	2	2
<b>Summary</b>	Run_Is_Compliant			Turbo_Setting:0
	Number_Of_Compliance_Issues(0)*			Median_Phase(p1)
<b>Unreviewed_VMmark3_Applications_Score</b>	36.57			
<b>Unreviewed_VMmark3_Infrastructure_Score</b>	2.37			
<b>Unreviewed_VMmark3_Score</b>	29.73			

## Configuration

Virtualization Software	
Hypervisor Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware ESXi 7.0 U2 Build 17583127 / 03-09-2021
Datacenter Management Software Vendor, Product, Version, and Build / Availability Date (MM-DD-YYYY)	VMware vCenter Server 7.0 U2 Build 17579766 / 03-09-2021
Supplemental Software	None
Servers	
Number of Servers in System Under Test (all subsequent fields in this section are per server)	4
Server Manufacturer and Model	Dell EMC PowerEdge R6525
Processor Vendor and Model	AMD EPYC 7713
Processor Speed (GHz) / Turbo Boost Speed (GHz)	2.0 / 3.675
Total Sockets/Total Cores/Total Threads	2 Sockets / 128 Cores / 256 Threads

Primary CPU Cache	32 KB I + 32 KB D on chip per core
Secondary CPU Cache	512 KB I+D on chip per core
Other CPU Cache	256 MB I+D on chip per chip, 32 MB shared / 8 cores
BIOS Version	2.0.3
Memory Size (in GB, Number of DIMMs)	2048, 32
Memory Type and Speed	64 GB 2Rx4 PC4-3200
Disk Subsystem Type	vSAN, iSCSI SAN
Number of Disk Controllers	1
Disk Controller Vendors and Models	Dell BOSS-S1
Total Number of Physical Disks for Hypervisor	2
Disk Vendors, Models, Capacities, and Speeds	Dell, SSDSCKKB240G8R, 240GB SSD, RAID 1
Number of Host Bus Adapters	None
Host Bus Adapter Vendors and Models	None
Number of Network Controllers	3
Network Controller Vendors and Models	Broadcom Gigabit Ethernet BCM5720 (Disabled) Mellanox ConnectX-5 EN 25GbE Dual-port Adapter Mellanox ConnectX-5 EN 100GbE Dual-port Adapter
Other Hardware	None
Other Software	None
Hardware Availability Date (MM-DD-YYYY)	03-15-2021
BIOS Availability Date (MM-DD-YYYY)	02-10-2021
Software Availability Date (MM-DD-YYYY)	03-09-2021
<b>Network</b>	
Network Switch Vendors and Models	Mellanox SN2700 32-port 100GbE Open Ethernet Switch
Network Speed	1 x 100 Gbps for Management, vSAN, and Standby and Template VM traffic 1 x 100 Gbps for vMotion and iSCSI traffic 2 x 25 Gbps for all Auction, Elastic, and DS3 VM traffic
<b>Primary Storage</b>	
Storage Category	VMware vSAN

Storage Vendors, Models, and Firmware Versions	4 x Dell EMC PowerEdge R6525 servers, with VMware vSAN 7.0 U2
Storage Configuration Summary	VMware vSAN <ul style="list-style-type: none"> <li>• 2 x Disk Groups per host</li> <li>• 2 x Dell Express Flash PM1735 1.6TB SFF FW 2.0.2, for vSAN Cache</li> <li>• 8 x Dell Express Flash PM1725b 3.2TB SFF FW 1.1.0, for vSAN Capacity</li> </ul>

**Datacenter Management Server**

System Model	Dell EMC PowerEdge R6415
Processor Vendor and Model	AMD EPYC 7551P
Processor Speed (GHz)	2.0 GHz
Total Sockets/Total Cores/Total Threads	1 Sockets / 32 Cores / 64 Threads
Memory Size (in GB, Number of DIMMs)	256 GB, 8
Network Controller(s) Vendors and Models	Mellanox ConnectX-5 EN 25GbE Dual-port Adapter
Operating System, Version, Bitness, and Service Pack	VMware ESXi 7.0 U2 Build 17583127
Virtual Center VM Number of vCPUs	8
Virtual Center VM Virtual Memory (in GB)	28
Virtual Center VM Operating System, Version, Bitness, and Service Pack	VMware vCenter Server 7.0 U2 Build 17579766
Other Hardware	Details in Notes for Workload
Other Software	None

**Clients**

Total Number of Virtual Clients / Virtual Client Hosts	33 / 6
System Model(s)	Dell EMC PowerEdge R6525
Processor Vendor(s) and Model(s)	AMD EPYC 7742
Processor Speed(s) (GHz)	2.25 GHz
Total Sockets/Total Cores/Total Threads	2 Sockets / 128 Cores / 256 Threads
Memory per Virtual Client Host	1024 GB
Network Controller(s) Vendors and Models	Mellanox ConnectX-5 EN 25GbE Dual-port Adapter

Virtual Client Networking Notes	Management and VM workload all connected to vSwitch with two uplinks
Virtual Client Storage Notes	All Clients on local Dell Express Flash PM1725b 3.2TB SFF LUN
Other Hardware	1 x Dell Express Flash PM1725b 3.2TB SFF FW 1.1.0 1 x Dell BOSS-S1 2 x Dell SSDSCKKB240G8R 240GB SSD, RAID 1
Other Software	VMware ESXi 7.0 U2, Build 17583127

#### Security Mitigations

Vulnerability	CVE	Exploit Name	Public Vulnerability Name	Mitigated		
				Server Firmware	ESXi	Guest OS
Spectre	2017-5753	Variant 1	Bounds Check Bypass	N/A	Not Vulnerable	Not Vulnerable
Spectre	2017-5715	Variant 2	Branch Target Injection	Not Vulnerable	Not Vulnerable	Not Vulnerable
Meltdown	2017-5754	Variant 3	Rogue Data Cache Load	N/A	Not Vulnerable	Not Vulnerable
Spectre-NG	2018-3640	Variant 3a	Rogue System Register Read	Not Vulnerable	N/A	N/A
Spectre-NG	2018-3639	Variant 4	Speculative Store Bypass	N/A	Not Vulnerable	Not Vulnerable
Foreshadow	2018-3615	Variant 5	L1 Terminal Fault - SGX	N/A	N/A	N/A
Foreshadow-NG	2018-3620	Variant 5	L1 Terminal Fault - OS	N/A	N/A	Not Vulnerable
Foreshadow-NG	2018-3646	Variant 5	L1 Terminal Fault - VMM	N/A	Not Vulnerable	N/A

## Notes for Workload

Template deployed with disk type: Thick Lazy

## Virtualization Software Notes

- vSphere DRS Migration Threshold level set to 1
- vSphere DRS Advanced Option AggressiveCPUActive set to 1
- Logging was disabled for all SUT VMs, client VMs, and the primeclient (Default is Enabled)
- CDROM & Floppy removed for all SUT VMs, except Template VMs (Default is Enabled)
- CPU and Memory shares set to high for all DS3DB VMs (Default is Normal)
- All Memory Reserved for DS3DB VMs (Default is Not reserved)
- sched.mem.pin set to TRUE for all DS3DB VMs (Default FALSE)
- CPU shares set to Low for all Standby VMs (Default is Normal)
- Third virtual disk removed from DS3DB0 before cloning DS3DB VMs for other tiles.

Advanced Settings:

- /adv/Numa/LocalityWeightActionAffinity = 0 (default 130)
- /adv/Cpu/HTWholeCoreThreshold = 0 (default 800)
- /adv/Mem/ShareScanGHz = 0 (default 4)



- /adv/UserVars/SuppressShellWarning = 1 (default 0)
- /adv/Virsto/DedupSpaceReclaim = 2 (default 0)

## Server Notes

### Server BIOS Settings

- NUMA Nodes Per Socket set to 1
- ApbDis set to P0
- DLWM set to x16
- System Profile set to Custom
- Determinism set to Power Determinism

## Networking Notes

### vSwitch Configuration

- vSwitch0 used for Management, vSAN traffic, and VM traffic for Standby and Template VMs
  - vmnic5 configured as uplink at 100 Gbps
  - MTU 9000 configured on vSwitch0, vmnic5, and vmk0 (default 1500)
- vSwitch1 used for vMotion and iSCSI traffic
  - vmnic4 configured as uplink at 100 Gbps
  - MTU 9000 configured on vSwitch1, vmnic4, and vmk1 (default 1500)
- vSwitch2 used for all DS3, Auction, and Elastic VM traffic
  - Both vmnic2 and vmnic3 configured as uplinks at 25 Gbps each
  - MTU 9000 configured on vSwitch2, vmnic2, and vmnic3 (default 1500)

Priority Flow Control enabled on the Mellanox switch

## Storage Notes

Host OS installed on Dell BOSS-S1 virtual disk for each host

- 2 x Dell SSDSCKKB240G8R 240GB SSDs configured in RAID1 for virtual disk boot LUN

### VMware vSAN (Primary Storage)

- VMware vSAN 7.0 U2
- Capacity: 102.4 TB
- Cache: 12.8 TB
- Hardware Configuration:
  - Each host had two disk groups. Each disk group used:
    - Caching drive: 1 x Dell Express Flash PM1735 1.6 TB SFF FW 2.0.2
    - Capacity drive: 4 x Dell Express Flash PM1725b 3.2 TB SFF FW 1.1.0
- Software Configuration:
  - Custom vSAN Storage Policy applied: Object Checksum Disabled
  - vSAN-over-RDMA enabled
- SUT vSAN datastore was used for all SUT VMs and template VMs

### Dell EMC Compellent Storage Array (Secondary Storage)

- Dell EMC Compellent CT-SC7020
- Physical Configuration
  - Unisphere 7.3.11.28
  - 2 x Compellent Storage Controllers
  - 4 x Compellent 25 Gbps iSCSI ports
  - 24 x Dell Compellent PM1633 1.92TB SFF SAS
  - Deduplication with compression was enabled across the entire array
  - Each volume was configured with RAID10 striped across all SSDs
  - The Compellent Storage Array is VAAI enabled
- Virtual Configuration
  - 2 x 1024 GB LUNs were used for Storage vMotion, XvMotion, and VM deploy infrastructure operation targets

## **Datacenter Management Server Notes**

VMware vCenter Server 7.0 U2 Build 17579766 was hosted on a Dell EMC R6415 system that was separate from the SUTs and clients.

## **Operating System Notes**

All Client and SUT hosts were installed with the VMware ESXi 7.0 U2, Build 17583127

## **Software Notes**

None

## **Client Notes**

Advanced Settings

- UserVars.SuppressShellWarning = 1 (default 0)

Client Host Storage

- VMware ESXi 7.0 U2 was installed on 2 x Dell SSDSCKKB240G8R 240GB SSDs configured in RAID1 on the Dell BOSS-S1 storage controller
- A VMFS datastore was created on the Dell Express Flash PM1725b 3.2TB for the Prime Client and all Client VMs
  - All Client VMs on Client Host 1 were stored on VMFS datastore client1
  - All Client VMs on Client Host 2 were stored on VMFS datastore client2
  - All Client VMs on Client Host 3 were stored on VMFS datastore client3
  - All Client VMs on Client Host 4 were stored on VMFS datastore client4
  - All Client VMs on Client Host 5 were stored on VMFS datastore client5
  - All Client VMs and Prime Client on Client Host 6 were stored on VMFS datastore client6

The Client VMs were distributed across the client hosts as follows:

- Client Host 1: Client0, Client6, Client12, Client18, Client24, Client30
- Client Host 2: Client1, Client7, Client13, Client19, Client25, Client31
- Client Host 3: Client2, Client8, Client14, Client20, Client26
- Client Host 4: Client3, Client9, Client15, Client21, Client27
- Client Host 5: Client4, Client10, Client16, Client22, Client28
- Client Host 6: Client5, Client11, Client17, Client23, Client29, and PrimeClient

## Client host vSwitch configuration

- All client VMs were connected to the same VM Network portgroup on vSwitch0
- Two 25 Gbps redundant uplinks, vmnic2 and vmnic3, were configured for vSwitch0
- The management interface was connected to vSwitch0
- MTU 9000 configured on vSwitch0, vmnic2 and vmnic3, and vmk0 (default 1500)

## Other Notes

Changes to VMmark3.properties file:

- TileDelay set to 5 (default 60)
- ScrubConfigFile was set to true (default false)
- ErrorImmediate was set to true (default false)

The PrimeClient VM STAF.cfg was modified as follows:

- "CONNECTTIMEOUT=10000" was added as follows:
  - "interface ssl library STAFTCP option Secure=Yes option CONNECTTIMEOUT=10000 option Port=6550"
  - default: "interface ssl library STAFTCP option Secure=Yes option Port=6550"
- "SET CONNECTATTEMPTS 5 CONNECTRETRYDELAY 2s" was added as a new line to STAF.cfg

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